

What is claimed is:

1. A carrier for latent electrostatic image development, comprising:

carrier particles, each carrier particle having:

a core particle; and

a coating layer covering the core particle,

wherein the core particle is a ferrite particle

comprising at least one of Zr in an amount of from 0.01% by mass to 5% by mass and Bi in an amount of from 0.005% by mass to 1% by mass.

2. A carrier for latent electrostatic image development according to Claim 1, wherein the ferrite particle comprises:

Fe in an amount of from 15% by mass to 45% by mass;

Mn in an amount of from 1% by mass to 25% by mass; and

Mg in an amount from 0.1% by mass to 1.0% by mass.

3. A carrier for latent electrostatic image development according to Claim 1, which has a magnetic moment of from 40 Am²/kg to 90 Am²/kg at 1 kilooersted.

4. A carrier for latent electrostatic image development according to Claim 1, wherein the carrier particles have a weight-average particle diameter Dw of from 20 μm to 65 μm, and

wherein the content of carrier particles having a particle diameter of 9 μm or less is 3.0% by weight or less.

5. A carrier for latent electrostatic image development according to Claim 1, wherein the coating layer comprises at least one of a silicone resin and an acrylic resin.

6. A carrier for latent electrostatic image development according to Claim 5, wherein the acrylic resin is contained in the coating layer in an amount of from 10% by weight to 90% by weight.

7. A carrier for latent electrostatic image development according to Claim 5, wherein the coating layer comprises a plurality of layers.

8. A carrier for latent electrostatic image development, comprising:

carrier particles, each carrier particle having:

a core particle; and

a coating layer covering the core particle,

wherein the core particle is a ferrite particle

comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass.

9. A carrier for latent electrostatic image development according to Claim 8, wherein the ferrite particle comprises Fe, Mn and Mg in amounts of from 10% by mass to 40% by mass, from 1% by mass to 25% by mass, and from 0.1% by mass to 1.0% by mass, respectively.

10. A carrier for latent electrostatic image development according to Claim 8, which has a magnetic moment of from 40 Am²/kg to 90 Am²/kg at 1 kilooersted.

11. A carrier for latent electrostatic image development according to Claim 8, wherein the carrier particles have a weight-average particle diameter D_w of from 20 μm to 65 μm , and wherein the content of carrier particles having a particle diameter of 9 μm or less is 3.0% by weight or less.

12. A carrier for latent electrostatic image development according to Claim 8, wherein the coating layer comprises at least one of a silicone resin and an acrylic resin.

13. A carrier for latent electrostatic image development according to Claim 12, wherein the acrylic resin is contained in the coating layer in an amount of from 10% by weight to 90% by weight.

14. A carrier for latent electrostatic image development

according to Claim 12, wherein the coating layer comprises a plurality of layers.

15. A carrier for latent electrostatic image development, comprising:

carrier particles, each carrier particle having:

a core particle; and

a coating layer covering the core particle,

wherein the core particle is a ferrite particle

comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and shows a dielectric breakdown voltage of 1000 V or more as determined by:

using a measuring instrument comprising:

a rotary sleeve housing a fixed magnet at a predetermined position and

an electrode arranged at a distance of 1 mm from the sleeve, and

applying a direct-current voltage to the carrier.

16. A carrier for latent electrostatic image development according to Claim 15, wherein the ferrite particle comprises Fe, Mn and Mg in amounts of from 10% by mass to 40% by mass, from 1% by mass to 25% by mass, and from 0.1% by mass to 1.0% by mass,

respectively.

17. A carrier for latent electrostatic image development according to Claim 15, wherein the carrier particles have a weight-average particle diameter D_w of from 20 μm to 65 μm , and wherein the content of carrier particles having a particle diameter of 9 μm or less is 3.0% by weight or less.

18. A carrier for latent electrostatic image development according to Claim 15, wherein the coating layer comprises at least one of a silicone resin and an acrylic resin.

19. A carrier for latent electrostatic image development according to Claim 18, wherein the acrylic resin is contained in the coating layer in an amount of from 10% by weight to 90% by weight.

20. A carrier for latent electrostatic image development according to Claim 18, wherein the coating layer comprises a plurality of layers.

21. A carrier for latent electrostatic image development, comprising:

carrier particles, each carrier particle having:

a core particle; and

a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from $65 \text{ Am}^2/\text{kg}$ to $90 \text{ Am}^2/\text{kg}$ at 1 kilooersted and which shows a dielectric breakdown voltage of 500 V or more as determined with a bridge measuring instrument by applying a direct-current voltage to the particles in a chain form at a distance between electrodes of from 1.7 mm to 2.3 mm in a magnetic field of 1500 gauss.

22. A carrier for latent electrostatic image development according to Claim 21, wherein the ferrite particle comprises Fe, Mn and Mg in amounts of from 10% by mass to 40% by mass, from 1% by mass to 25% by mass, and from 0.1% by mass to 1.0% by mass, respectively.

23. A carrier for latent electrostatic image development according to Claim 21, wherein the carrier particles have a weight-average particle diameter D_w of from $20 \mu\text{m}$ to $65 \mu\text{m}$, and wherein the content of carrier particles having a particle diameter of $9 \mu\text{m}$ or less is 3.0% by weight or less.

24. A carrier for latent electrostatic image development according to Claim 21, wherein the coating layer comprises at least one of a silicone resin and an acrylic resin.

25. A carrier for latent electrostatic image development according to Claim 24, wherein the acrylic resin is contained in the coating layer in an amount of from 10% by weight to 90% by weight.

26. A carrier for latent electrostatic image development according to Claim 25, wherein the coating layer comprises a plurality of layers.

27. A developer, comprising:
a toner in the form of particles each having a binder resin and a coloring agent; and
a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,
wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.01% by mass to 5% by mass and Bi in an amount of from 0.005% by mass to 1% by mass.

28. A developer according to Claim 27, wherein the toner particles have a weight-average particle diameter D_w of from 3 μm to 10 μm .

29. A developer, comprising:
a toner in the form of particles each having a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass.

30. A developer according to Claim 29, wherein the toner particles have a weight-average particle diameter D_w of from 3 μm to 10 μm .

31. A developer, comprising:

a toner in the form of particles each having a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am^2/kg to 90 Am^2/kg at 1 kilooersted and shows a dielectric breakdown voltage of 1000 V or more as determined by:

using a measuring instrument comprising:

a rotary sleeve housing a fixed magnet at a predetermined position and

an electrode arranged at a distance of 1 mm from the

sleeve, and

applying a direct-current voltage to the carrier.

32. A developer according to Claim 31, wherein the toner particles have a weight-average particle diameter D_w of from 3 μm to 10 μm .

33. A developer, comprising:

a toner in the form of particles each having a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am^2/kg to 90 Am^2/kg at 1 kilooersted and which shows a dielectric breakdown voltage of 500 V or more as determined with a bridge measuring instrument by applying a direct-current voltage to the particles in a chain form at a distance between electrodes of from 1.7 mm to 2.3 mm in a magnetic field of 1500 gauss.

34. A developer according to Claim 33, wherein the toner particles have a weight-average particle diameter D_w of from 3 μm to 10 μm .

35. A container housing a developer, the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.01 % by mass to 5 % by mass and Bi in an amount of from 0.005 % by mass to 1 % by mass.

36. A container housing a developer, the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005 % by mass to 4 % by mass and Bi in an amount of from 0.001 % by mass to 0.9 % by mass.

37. A container housing a developer, the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and shows a dielectric breakdown voltage of 1000 V or more as determined by:

using a measuring instrument comprising:

a rotary sleeve housing a fixed magnet at a predetermined position and

an electrode arranged at a distance of 1 mm from the sleeve, and

applying a direct-current voltage to the carrier.

38. A container housing a developer, the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65

Am²/kg to 90 Am²/kg at 1 kilooersted and which shows a dielectric breakdown voltage of 500 V or more as determined with a bridge measuring instrument by applying a direct-current voltage to the particles in a chain form at a distance between electrodes of from 1.7 mm to 2.3 mm in a magnetic field of 1500 gauss.

39. An image forming apparatus, comprising:
- a latent electrostatic image bearing member for bearing a latent electrostatic image;
 - a latent electrostatic image forming unit for forming a latent electrostatic image on the latent electrostatic image bearing member;
 - a developing unit for developing the latent electrostatic image using a developer to form a visible image;
 - a transferring unit for transferring the visible image to a recording medium; and
 - a fixing unit for fixing the transferred image on the recording medium,
- the developer comprising:
- a toner in the form of particles each having at least a binder resin and a coloring agent; and
 - a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle, wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.01 % by mass to 5 % by mass and Bi in an amount of from 0.005 % by mass to 1 % by mass.

40. An image forming apparatus, comprising:
a latent electrostatic image bearing member for bearing a latent electrostatic image;
a latent electrostatic image forming unit for forming a latent electrostatic image on the latent electrostatic image bearing member;
a developing unit for developing the latent electrostatic image using a developer to form a visible image;
a transferring unit for transferring the visible image to a recording medium; and
a fixing unit for fixing the transferred image on the recording medium,
the developer comprising:
a toner in the form of particles each having at least a binder resin and a coloring agent; and
a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,
wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass.

41. An image forming apparatus, comprising:
a latent electrostatic image bearing member for bearing a latent electrostatic image;
a latent electrostatic image forming unit for forming a latent

electrostatic image on the latent electrostatic image bearing member;

a developing unit for developing the latent electrostatic image using a developer to form a visible image;

a transferring unit for transferring the visible image to a recording medium; and

a fixing unit for fixing the transferred image on the recording medium,

the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and shows a dielectric breakdown voltage of 1000 V or more as determined by:

using a measuring instrument comprising:

a rotary sleeve housing a fixed magnet at a predetermined position and

an electrode arranged at a distance of 1 mm from the sleeve, and

applying a direct-current voltage to the carrier.

42. An image forming apparatus, comprising:

- a latent electrostatic image bearing member for bearing a latent electrostatic image;
- a latent electrostatic image forming unit for forming a latent electrostatic image on the latent electrostatic image bearing member;
- a developing unit for developing the latent electrostatic image using a developer to form a visible image;
- a transferring unit for transferring the visible image to a recording medium; and
- a fixing unit for fixing the transferred image on the recording medium,

the developer comprising:

- a toner in the form of particles each having at least a binder resin and a coloring agent; and
- a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle, wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and which shows a dielectric breakdown voltage of 500 V or more as determined with a bridge measuring instrument by applying a direct-current voltage to the particles in a chain form at a distance between electrodes of from 1.7 mm to 2.3 mm in a magnetic field of 1500 gauss.

43. An image forming process, comprising the steps of:
forming a latent electrostatic image on a latent electrostatic image bearing member;
developing the latent electrostatic image using a developer to form a visible image;
transferring the visible image to a recording medium; and
fixing the transferred image on the recording medium,
the developer comprising:
a toner in the form of particles each having at least a binder resin and a coloring agent; and
a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,
wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.01% by mass to 5% by mass and Bi in an amount of from 0.005% by mass to 1% by mass.

44. An image forming process, comprising the steps of:
forming a latent electrostatic image on a latent electrostatic image bearing member;
developing the latent electrostatic image using a developer to form a visible image;
transferring the visible image to a recording medium; and
fixing the transferred image on the recording medium,
the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass.

45. An image forming process, comprising the steps of:
forming a latent electrostatic image on a latent electrostatic image bearing member;

developing the latent electrostatic image using a developer to form a visible image;

transferring the visible image to a recording medium; and
fixing the transferred image on the recording medium,
the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and shows a dielectric

breakdown voltage of 1000 V or more as determined by:

using a measuring instrument comprising:

a rotary sleeve housing a fixed magnet at a predetermined position and

an electrode arranged at a distance of 1 mm from the sleeve, and

applying a direct-current voltage to the carrier.

46. An image forming process, comprising the steps of:
forming a latent electrostatic image on a latent electrostatic image bearing member;

developing the latent electrostatic image using a developer to form a visible image;

transferring the visible image to a recording medium; and

fixing the transferred image on the recording medium,

the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass,

wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and which shows a dielectric

breakdown voltage of 500 V or more as determined with a bridge measuring instrument by applying a direct-current voltage to the particles in a chain form at a distance between electrodes of from 1.7 mm to 2.3 mm in a magnetic field of 1500 gauss.

47. A process cartridge, being attachable to and detachable from a main body of image forming apparatus and integrally comprising:

- a developing unit for developing a latent electrostatic image using a developer to form a visible image; and

- at least one selected from the group consisting of:

- a latent electrostatic image bearing member for bearing a latent electrostatic image;

- a latent electrostatic image forming unit for forming a latent electrostatic image on the latent electrostatic image bearing member; and

- a cleaning unit for cleaning,

- the developer comprising:

- a toner in the form of particles each having at least a binder resin and a coloring agent; and

- a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

- wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.01 % by mass to 5 % by mass and Bi in an amount of from 0.005 % by mass to 1 % by mass.

48. A process cartridge, being attachable to and detachable from a main body of image forming apparatus and integrally comprising:

a developing unit for developing a latent electrostatic image using a developer to form a visible image; and

at least one selected from the group consisting of:

a latent electrostatic image bearing member for bearing a latent electrostatic image;

a latent electrostatic image forming unit for forming a latent electrostatic image on the latent electrostatic image bearing member; and

a cleaning unit for cleaning,

the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass.

49. A process cartridge, being attachable to and detachable from a main body of image forming apparatus and integrally comprising:

a developing unit for developing a latent electrostatic image using a developer to form a visible image; and

at least one selected from the group consisting of:

a latent electrostatic image bearing member for bearing a latent electrostatic image;

a latent electrostatic image forming unit for forming a latent electrostatic image on the latent electrostatic image bearing member; and

a cleaning unit for cleaning,

the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and shows a dielectric breakdown voltage of 1000 V or more as determined by:

using a measuring instrument comprising:

a rotary sleeve housing a fixed magnet at a predetermined position and

an electrode arranged at a distance of 1 mm from the sleeve, and

applying a direct-current voltage to the carrier.

50. A process cartridge, being attachable to and detachable from a main body of image forming apparatus and integrally comprising:

a developing unit for developing a latent electrostatic image using a developer to form a visible image; and

at least one selected from the group consisting of:

a latent electrostatic image bearing member for bearing a latent electrostatic image;

a latent electrostatic image forming unit for forming a latent electrostatic image on the latent electrostatic image bearing member; and

a cleaning unit for cleaning,

the developer comprising:

a toner in the form of particles each having at least a binder resin and a coloring agent; and

a carrier having carrier particles, each carrier particle having a core particle and a coating layer covering the core particle,

wherein the core particle is a ferrite particle comprising at least one of Zr in an amount of from 0.005% by mass to 4% by mass and Bi in an amount of from 0.001% by mass to 0.9% by mass, wherein the carrier particle has a magnetic moment of from 65 Am²/kg to 90 Am²/kg at 1 kilooersted and which shows a dielectric breakdown voltage of 500 V or more as determined with a bridge

measuring instrument by applying a direct-current voltage to the particles in a chain form at a distance between electrodes of from 1.7 mm to 2.3 mm in a magnetic field of 1500 gauss.